ABSTRACT

Disclosed is a heat-resistant Ti alloy material excellent in high-temperature corrosion resistance and oxidation resistance, which comprises a base made of a heat-resistant Ti alloy and a surface layer formed on the surface of the base. The surface layer has a multilayer structure including an inner layer and an outer layer. The inner layer has three coexistent phases consisting of a β phase, a γ phase and a Laves phase in the phase diagram of a Ti-Al-Cr based alloy, and the outer layer is made of an Al-Ti-Cr based alloy having an Al concentration of 50 atomic % or more. The heat-resistant Ti alloy material is produced by subjecting a substrate made of a heat-resistant Ti alloy to a Cr diffusion treatment at a temperature within a β single-phase region in the phase diagram of a Ti-Al-Cr based alloy, precipitating a γ phase and a Laves phase from the β phase during a cooling process to form the inner layer with three coexistent phases consisting of the β, γ and Laves phases, and then subjecting the obtained product to an Al diffusion treatment to form the outer layer. The heat-resistant Ti alloy material can prevent the diffusion of Al from the outer layer to the base and the diffusion of elements of the base to the outer layer while forming a protective Al_2O_3 film in a self-repairing manner, to provide excellent high-temperature corrosion resistance and oxidation resistance to the heat-resistant Ti alloy base.